

REMARKS

Claims 1, 3-11, 13-18, and 21-28 are pending. Claims 1, 4-9, 11, 14-17, and 21-28 have been amended. No new matter has been introduced. Reexamination and reconsideration of this application are respectfully requested.

In the June 26, 2003 Office Action, the Examiner rejected claims 1, 3-11, 13-18, and 21-28 under (a) 35 U.S.C. §112, ¶1, as failing to comply with the written description requirement, and (b) 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,363,160 to Bradski et al. ("Bradski"). These rejections are respectfully traversed.

Embodiments of the present invention are directed to an automated calibration system to track a selected object through a series of frames of data. A display device displays at least one image frame received from an image input device. The image frame includes a calibration rectangle. An image selection device utilizes the calibration rectangle to select the selected object in the at least one image frame to track. An image source device provides a hue saturation value (HSV) data array of pixels forming the at least one image frame. A processing device determines analysis data for pixels within the calibration rectangle based on the HSV data array, and determines test analysis data for a set of adjacent test windows. Each of the adjacent test windows has the same shape as the calibration rectangle. Tracking data, to track the selected object, is selected from one of the calibration rectangle and the adjacent test windows having a lowest sum of a hue standard deviation and a saturation standard deviation.

In the June 26, 2003 Office Action, the Examiner rejected claims 1, 3-11, 13-18, and 21-28 under 35 U.S.C. §112, ¶1, as failing to comply with the written description

requirement. Specifically, with respect to claims 1 and 9, the Examiner stated the following (emphasis in original):

The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The terms such as "an analysis module", "the calibration window", "the adjacent test windows" shown in the claim are not found in the specification. In addition, the following claim limitation shown in claim 1 is *not* supported by the specification, i.e., "an analysis module to determine analysis test data for pixels within the calibration window, based on the HSV data array, and to determine test analysis data for a set of adjacent test windows, each of the adjacent test windows having a same shape as a calibration window, where tracking data, to track the selected object, is selected from one of the calibration window and the adjacent test windows having a highest tracking probability."

Although applicants believe that independent claims 1 and 9 as amended in the amendment filed on June 3, 2003, did comply with 35 U.S.C. §112, ¶1, applicants have amended independent claims 1 and 9 to overcome the Examiner's rejection.

Representative independent claim 1, as amended, recites (with emphasis added):

"An automated calibration system to track a selected object through a series of frames of data, comprising:
a display device to display at least one image frame received from an image input device, wherein the image frame includes a **calibration rectangle**;
an image selection device to select, via the **calibration rectangle**, the selected object in the at least one image frame;
an image source device to provide a hue saturation value (HSV) data array of pixels forming the at least one image frame; and
a **processing device to determine analysis data for pixels within the calibration rectangle, based on the HSV data array, and determine test analysis data for a set of adjacent test windows, each of the adjacent test windows having a same shape as the calibration rectangle, wherein tracking data, to track the selected object, is selected from one of the calibration rectangle and the adjacent test windows having a lowest sum of a hue standard deviation and a saturation standard deviation, and each of the adjacent test windows share at least one pixel with the calibration rectangle.**"

With respect to independent claim 1, as amended, "calibration window" was amended to "calibration rectangle". Support may be found at, for example, page 10, lines 1-2, in the specification as originally filed.

The last clause of independent claim 1 has been amended from (with emphasis

added):

“an analysis module to determine analysis data for pixels within the calibration window, based on the HSV data array, and determine test analysis data for a set of adjacent test windows, each of the adjacent test windows having a same shape as the calibration window, wherein tracking data, to track the selected object, is selected from one of the calibration window and the adjacent test windows having a highest tracking probability.”

to the following (with emphasis added):

“a processing device to determine analysis data for pixels within the calibration rectangle, based on the HSV data array, and determine test analysis data for a set of adjacent test windows, each of the adjacent test windows having a same shape as the calibration rectangle, wherein tracking data, to track the selected object, is selected from one of the calibration rectangle and the adjacent test windows having a lowest sum of a hue standard deviation and a saturation standard deviation.”

“[A]n analysis module” was amended to “a processing device”. Support for “a processing device” may be found at, for example, page 31, lines 9-11, in claim 1 as originally filed. Applicants note that the “original claims as filed are part of the patent specification.” *Northern Telecom Inc. v. Datapoint Corp.*, 15USPQ2d 1321, 1326 (Fed. Cir. 1990). Applicants note than support for “test windows” may be found at, for example, page 15, lines 10-16. Support for “determine test analysis data for a set of adjacent test windows” may be found at, for example, page 15, line 10 - page 16, line 20. Support for “is selected from one of the calibration window and the adjacent test windows having a lowest sum of a hue standard deviation and a saturation standard deviation” may be found at, for example, page 16, line 21 – page 18, line 18.

Accordingly, for the reasons set forth above, applicants respectfully submit that independent claim 1, as amended, does comply with the written description requirement of 35 U.S.C. §112, ¶1. Independent claim 9, as amended, contains limitations similar to those of independent claim 1, as amended, and therefore also

complies with the written description requirement of 35 U.S.C. §112, ¶1 for reasons similar to those set forth above with respect to independent claim 1, as amended. Claims (a) 3-8 and 21-24, and (b) 10-11, 13-18, and 25-28, were all rejected under 35 U.S.C. §112, ¶1, as failing to comply with the written description requirement based on their dependencies from independent claims 1 and 9, respectively. Accordingly, because independent claims 1 and 9, as amended, comply with the written description requirement of 35 U.S.C. §112, ¶1, claims (a) 3-8 and 21-24, and (b) 10-11, 13-18, and 25-28, also comply with the written description requirement for the same reasons as those set forth above with respect to independent claims 1 and 9, respectively.

Accordingly, applicants respectfully submit that the rejection of claims 1, 3-11, 13-18, and 21-28 under 35 U.S.C. §112, ¶1 should be withdrawn.

The Examiner also rejected claims 1, 3-11, 13-18, and 21-28 under 35 U.S.C. §102(e) as being anticipated by Bradski. The Examiner stated that Bradski discloses an automated calibration system to track a selected object through a series of frames of data, and includes (a) a display device to display at least one image frame, where the image frame includes a calibration window; (b) an image selection device to select, via the calibration window, the selected object in the image frame; (c) an image source device to provide a hue saturation value (HSV) data array of pixels in the at least one image frame; and (d) an analysis module to determine analysis data for pixels within the calibration window, based on the HSV data array, and determine test analysis data for a set of adjacent test windows having a same shape as the calibration window.

Bradski teaches a method of tracking gestures. A user 110 sits in front of a video camera 120, and a computer system 157 digitizes the "talking head" image of the

user 110. [Col. 3, line 61 – col. 4, line 10.] Each pixel of the video image is converted to or captured in a hue (H), saturation (S), and value (V) colorspace. Certain hue values in a sample region of the video image are accumulated into a flesh hue histogram. Hue values are only accumulated if their corresponding saturation (S) and value (V) values are above respective saturation (S) and value (V) thresholds. [Col. 4, lines 20-22.] After sampling all pixels in the sample area, a flesh hue histogram is normalized to create a flesh hue probability histogram. Once the flesh hue probability histogram has been created, video images are quickly converted into flesh hue probability distributions, and can be used to locate the center of an object and track the object. [Col. 4, lines 46-49 and 60-62.]

Accordingly, Bradski teaches determining hue, saturation, and value amounts for pixels in an image. *Images are tracked based on a hue probability distribution, and only the hue of a pixel is utilized for tracking, provided its corresponding saturation and value amounts are above respective thresholds.*

However, Bradski does not disclose, teach, or suggest an automated calibration system to track a selected object through a series of frames of data, including (a) a display device to display at least one image frame received from an image input device, wherein the image frame includes a calibration rectangle; (b) an image selection device to select, via the calibration rectangle, the selected object in the at least one image frame; (c) an image source device to provide a hue saturation value (HSV) data array of pixels forming the at least one image frame; and (d) a processing device to determine analysis data for pixels within the calibration rectangle, based on the HSV data array, and determine test analysis data for a set of adjacent test windows, each of

the adjacent test windows having a same shape as the calibration rectangle, wherein tracking data, to track the selected object, is selected from one of the calibration rectangle and the adjacent test windows having a **lowest sum of a hue standard deviation and a saturation standard deviation**.

Bradski does not teach such adjacent test windows having a same shape as the calibration rectangle, wherein tracking data, to track the selected object, is selected from one of the calibration rectangle and the adjacent test windows having a ***lowest sum of a hue standard deviation and a saturation standard deviation***. In Bradski, the hue probability distribution only is used to track, provided the saturation and value amounts are above certain thresholds. Therefore, Bradski does not disclose, teach, or suggest use of a lowest sum of a hue standard deviation and a saturation standard deviation to determine tracking data to track a selected object. Accordingly, independent claim 1, as amended, distinguishes over Bradski.

Claims 3-8 and 21-24 all depend, directly or indirectly, from independent claim 1, as amended. Accordingly, claims 3-8 and 21-24 also distinguish over Bradski for the same reasons as those set forth above with respect to independent claim 1, as amended. Independent claim 9, as amended, contains limitations similar to those of independent claim 1, and therefore also distinguishes over Bradski for reasons similar to those set forth above with respect to independent claim 1, as amended. Claims 11, 13-18, and 25-28 all depend, directly or indirectly, from independent claim 9, as amended, and therefore also distinguish over Bradski for the same reasons as those set forth above with respect to independent claim 9, as amended.

Moreover, claim 5 further distinguishes over Bradski. Claim 5 recites (with

emphasis added): “[t]he system of claim 1, wherein the **processing device calculates a mean hue and a standard deviation of a hue of the pixels representing the selected object.**” As stated above, Bradski discloses no such calculation of a mean hue and a standard deviation of a hue of the pixels representing the selected object. The Examiner states that FIGS. 3A, 3B and 4, and col. 4, lines 2-57; col. 10, lines 1-16; col. 5, lines 31-63; column 6, lines 22-44; and col. 12, lines 1-67 disclose such calculation of a mean hue and a standard deviation of a hue of the pixels representing the selected object. Applicant respectfully disagrees with the Examiner. None of the cited passages or FIGS. disclose, teach, or suggest such calculation of a mean hue and a standard deviation of a hue of the pixels representing the selected object. Accordingly, claim 5 further distinguishes over Bradski. Claim 6 directly depends from claim 5 and therefore also further distinguishes over Bradski for the same reasons as those set forth above with respect to claim 5.

Claim 14 contains limitations similar to those of claim 5, and therefore also further distinguishes over Bradski for reasons similar to those set forth above with respect to claim 5. Claim 15 directly depends from claim 14 and therefore also further distinguishes over Bradski for the same reasons as those set forth above with respect to claim 14.

Claim 7 also further distinguishes over Bradski. Claim 7 recites (with emphasis added): “[t]he system of claim 1, wherein the **processing device calculates a mean saturation and a standard deviation of a saturation of the pixels representing the selected object.**” As stated above, Bradski discloses no such calculation of a mean saturation and a standard deviation of a saturation of the pixels representing the

selected object. Again, the Examiner states that FIGS. 3A, 3B and 4, and col. 4, lines 2-57; col. 10, lines 1-16; col. 5, lines 31-63; column 6, lines 22-44; and col. 12, lines 1-67 disclose such calculation of a mean hue and a standard deviation of a hue of the pixels representing the selected object. Applicant respectfully disagrees with the Examiner. None of the cited passages or FIGS. disclose, teach, or suggest such calculation of a mean saturation and a standard deviation of a saturation of the pixels representing the selected object. Accordingly, claim 7 further distinguishes over Bradski. Claim 8 directly depends from claim 7 and therefore also further distinguishes over Bradski for the same reasons as those set forth above with respect to claim 7.

Claim 16 contains limitations similar to those of claim 7, and therefore also further distinguishes over Bradski for reasons similar to those set forth above with respect to claim 7. Claim 17 directly depends from claim 16 and therefore also further distinguishes over Bradski for the same reasons as those set forth above with respect to claim 16.

Claim 28 also further distinguishes over Bradski. Claim 28 recites (with emphasis added): “[t]he method according to claim 9, wherein the method further includes **creating a pixel-classification look-up map for the HSV data array of pixels, wherein the pixel classification map classifies the pixels belonging to the selected object based on a hue and a saturation of the pixels.**” Bradski teaches no such pixel-classification map which classifies the pixel belonging to the selected object based on a *hue and a saturation* of the pixels. Accordingly, claim 28 further distinguishes over Bradski. Claim 11 directly depends from claim 28 and therefore also further distinguishes over Bradski for the same reasons as those set forth above with

respect to claim 28.

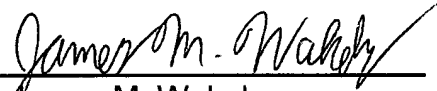
Accordingly, applicants respectfully submit that the rejection of claims 1, 3-11, and 13-18, and 21-28 under 35 U.S.C. §102(e) should be withdrawn.

Applicants believe that the foregoing amendments place the application in condition for allowance, and a favorable action is respectfully requested. If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call either of the undersigned attorneys at the Los Angeles telephone number (213) 488-7100 to discuss the steps necessary for placing the application in condition for allowance should the Examiner believe that such a telephone conference would advance prosecution of the application.

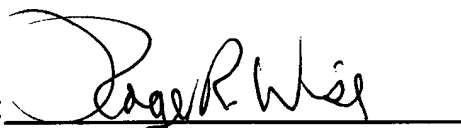
Respectfully submitted,

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